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III. REMARKS

Status of the Claims

Applicant has cancelled claim 9 and amended independent claim 18 to accentuate the novel features of the invention for which protection is sought in this application. Claims 2-7, and 9-18 remain under consideration. These amendments are submitted after final rejection in order to place this application in condition for allowance or in the alternative to place the claims in better condition for appeal. Since this response was necessitated by the Examiner's new basis for rejection and the citation of new art, applicant requests that the Examiner enter these amendments.

Summary of the Office Action

Claims 2-7 and 9-18 remain rejected under 35USC103(a) on the basis of the cited reference Miyazawa, et al, U.S. Patent No. 6,070,139, in view of the reference Weintraub, U.S. Patent No. 5,842,163. The Examiner is respectfully requested to reconsider his rejection in view of the above amendments and the following arguments.

The Invention

As described in amended claim 18, a method is described for recognizing inputs and selecting matching words. Candidate matching words are presented to the user for selection in an order of preference based on a confidence value which is further weighted by a probability of use, cumulatively, the "overall

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probability of use". The probability of use is calculated based on prior use of the presented word. In particular the probability value is based on a ratio of the number of times a data record was used over a certain period of times to the total number of times data records have been used over the same period. Neither of the cited references disclose such a method.

Discussion of the Cited References

The reference Miyazawa is acknowledged by the Examiner as not disclosing the calculation of an overall probability value of matching data record from its confidence value based on use. To remedy this deficiency, the Examiner cites the reference Weintraub. Applicant submits that there is no mention of basing a probability value on a ratio as defined in amended claim 18.

In particular, Weintraub discloses a system and a method of improving the confidence score in keyword spotting in a large vocabulary continuous speech recognition system. The confidence score is typically a LOG-probability score indicating the strength of belief that a keyword has appeared in a spoken utterance. Typically, if the confidence score exceeds a preset threshold, the keyword spotting system will declare that it has "detected" the appearance of the keyword. The threshold can be chosen as a trade off between false alarms and higher detection rate (cf. column 1, line 67 to column 2, Line 9). This confidence score is comparable with the confidence value disclosed by Miyazawa and mentioned in the present application.

In general, keyword spotting is a very specific branch of speech recognition and becomes more and more important. Latest research experiences show that it is nearly impossible to design a speech

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recognizer that covers all words uttered during the practical application. Therefore, the approach of only detecting keywords within any other words, sounds, and noise, without modeling these non-keyword parts of the utterance, as it is done in keyword spotting, can be considered very promising.

Consequently, Weintraub suggests an improved keyword spotting method that determines the likelihood of appearance of keywords in a spoken utterance. In particular, as can be seen from the description of the confidence score computer 30 (column 3, line 52 to column 4, line 11), the confidence score computer 30 receives, as input, possible word sequences and likelihood scores for each sequence and provides as output the confidence score, the word itself and a time stamp to an application.

According to the formula given at the top of column 5 the confidence score output by the confidence score computer 30 is calculated as a confidence score of the keywords (that is comparable with confidence value taught by Miyazawa) by dividing the sum of N-best word sequences containing the keyword by the sum of all N-best word sequences for a given set of observations. This confidence score or metric is the acoustic HMM probability (cf. column 5, line 9) and will be multiplied by a language model probability $P(W)$ (cf. column 5, line 10).

However, such a language model probability used in a large vocabulary speaker independent continuous-speech recognition system is not comparable with a user specific probability value that is based on the historical usage of words, since the former is a static value that depends on the general usage of a spoken language but not on a certain speaker.

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In contrast to the Examiner's opinion Weintraub (US 5,842,163) fails to disclose an overall probability that is calculated from a confidence value similar to that disclosed by Miyazawa and a probability value that is calculated for each stored data record as a ratio of the number of times this data record has been used during a certain period in the recent past to the total number of times all the data records have been used during this certain period.

For example, if the present invention is used in connection with a navigation system for inputting a destination, the probability value for a certain destination is calculated by the number of times this destination has been selected by a user during, for

Example, the last two months divided by the total number of inputting destinations during this period by the user.

Thus, the present invention provides a method in which a probability value is used that is based on the historical usage of words by a user of the speech recognition system. Therefore, the probability value according to the present invention will be automatically adapted to a new user or to a new behavior/manner of usage if the user or his/her habit changes.

Weintraub fails to disclose such a probability value.

The Examiner, in referring to claim 9, cites column 9, lines 12-43 of the reference Miyazawa as: "discloses the probability value for a data record corresponds to the ratio of the number of times this data record has been used to the total number of times all the data records have been used". First of all in the context of the subject invention, Miyazawa is directed to a

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confidence value and the cited material is limited to this portion of recognition. Further, a careful review of the cited material (column 9, lines 21-26) describes the confidence level, to which Miyazawa refers, as:

"1)selecting the potential recognition candidate exhibiting the highest absolute degree of similarity to the input voice using confidence level comparisons as the actually recognized keyword; or by 2)selecting one of the words as the recognized word utilizing a predefined correlation table expressing context rules between words."

Clearly the cited material of Miyazawa does not support the Examiner's contention. There is no mention of basing a probability value on recent use versus overall use for a given time period.

Applicant submits the method of amended claim 18 is not disclosed in the cited references either alone or in combination. The deficiencies of Miyazawa are not remedy by the teachings of Weintraub and visa versa.

The above arguments are equally applicable to the rejected dependent claims.

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SUMMARY

In view of the amendments to this application and the arguments stated above, Applicant submits that the claims under consideration contain patentable subject matter and favorable action by the Examiner is respectfully requested.

The Commissioner is hereby authorized to charge payment for any fees associated with this communication or credit any over payment to Deposit Account No. 16-1350.

Respectfully submitted,

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16 April 2003

Date

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